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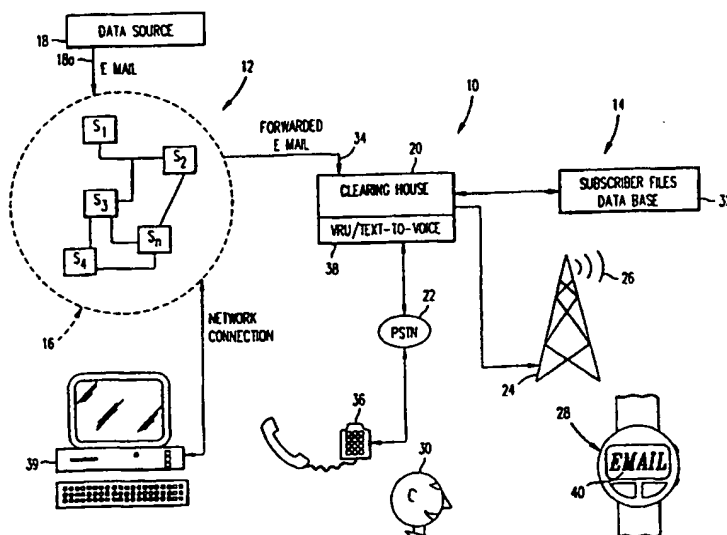
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## (57) Abstract

A radio paging system (14) which includes a number of paging receivers (28), each receiver (28) being associated with a subscriber (30). The subscriber (30) also receives electronic mail (34) from a separate computer network (12). The system provides a device (20) for sending paging messages (26) when an electronic mail message (34) is received from the separate network (12). During a system configuration step, an example electronic mail message is displayed to a subscriber (30). The subscriber (30) identifies information in the example by use of a pointing device to designate selected portions of a message. Rules are thereby established which are applied to subsequent electronic mail messages (34) to extract similar information. Each time an electronic message is received, a paging message (26) is sent to the paging receiver (28) which includes the information obtained by applying the previously established rules to the subsequent message.

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## ELECTRONIC MAIL NOTIFICATION AND ACCESS

### FIELD OF THE INVENTION

The present invention relates generally to communication, and particularly to devices and systems receiving and providing access to information.

### BACKGROUND OF THE INVENTION

As computer systems and computer networks evolve, information in and of itself becomes an important commodity. In the context of computer network systems, persons receive information daily by indirect interaction with other users on a computer network. For example, one person sends electronic mail (e mail) to another person by way of a computer network mail server. Computer networks include a variety of configurations from local area networks (LAN) to global communication networks such as the Internet. E mail provides a common mechanism delivering information from one computer network user to another computer network user. A typical e mail message includes an "electronic address" field specifying a destination for the e mail item and an "electronic address" field specifying the origin of the e mail item. The e mail item enters the computer network and the various computing devices operating on the network reference the "electronic address" destination field to determine how the e mail item is to be handled. The Internet, as a global communications network, allows a unique electronic address for an individual whereby that individual receives e mail messages from virtually any source anywhere having access to the Internet.

Many e mail delivery systems also include an ability to automatically "forward" copies of messages to another address. The sending party need not be aware of the forwarding feature. A user establishes forwarding of e mail messages locally, i.e., at his or her mail server, for delivery of copies of e mail items to selected destinations, i.e., selected "electronic addresses."

E mail messages typically arrive unpredictably. Users must access an information provider, e.g., Internet service provider, to determine whether any new e mail messages have arrived. Some people check their e mail once a day or even less frequently. Other people find need to check more frequently, e.g., several times each day, as e mail messages may be vitally important and thereby making immediate notification of new e mail messages desirable. In some systems, if the user is currently logged onto the mail server then an e mail notification appears at the user's terminal. Generally, each user must occasionally access the e mail server, or remain logged onto the e mail server, to maintain ongoing and current notification of incoming e mail messages.

E mail notification also occurs by remote wireless communication devices, e.g., paging receivers. Under such schemes, a user receives an "e mail notification" paging message whenever new e mail messages arrive at his or her mail server. For example, the user establishes a forwarding feature reacting to receipt of incoming e mail messages by causing transmission of an "e mail notification" paging message to the user's paging device. The user, upon receiving an "e mail notification" paging message, accesses his or her Internet service provider e mail server to review the content of the just-received e mail message.

Unfortunately, the user does not always have convenient access to a network computer terminal for purposes of reviewing the newly received e mail message. For persons having

ready access to their e mail server, a paging message indicating new e mail is useful. For others, however, such an "e mail notification" paging message is of lesser value. For example, a user may receive an "e mail notification" paging message, but have no indication of its value, e.g., need to review immediately, or no way to immediately review the pertinent content of the just-received e mail message.

As Internet activity and quantity of information available proliferate, e mail becomes increasingly popular as a mechanism delivering "pushed" data to users. Users subscribe to a variety of information content as "pushed" data. In addition to vitally important or critical e mail messages, users also receive numerous additional low priority e mail messages. Users sort through several, or in many cases, 10 or 20 or more, e mail messages daily to identify and review high priority items and only peruse lesser priority items. Among the "pushed" data arriving constantly by way of e mail, users often find little interest in many e mail messages from a given source, but occasionally find particular interest in e mail messages from that particular source when such e mail messages contain particular content. Knowing only the source of the e mail message, i.e., the "electronic address" origin field, the user must access a mail server and review the entire content of that e mail message to satisfy that specific user's particular interest.

A user receiving an "e mail notification" paging message may receive a great number of such paging messages, especially when each and every new e mail item triggers transmission of a paging message to his or her paging device. Such overwhelming number of paging messages with little or no additional guidance as to the nature, source, or particular content reduces the value of and makes a nuisance of an "e mail notification" paging message. Thus, receiving an "e mail notification" paging message may be of limited value if the person carrying the paging device

has no indication of the particular nature of the just-received e mail message. Many e mail messages have little value to the user and the user does not wish to even be notified of, let alone immediately review, such e mail messages. On the other hand, some e mail messages may be vitally important to the user and the user always wants to review such messages immediately at the first opportunity to do so, i.e., following an "e mail notification" paging message.

Some e mail notification schemes with an "e mail notification" paging message also include a predetermined portion of the e mail message to indicate to the user the subject or source of the just-received e mail message. For example, in addition to receiving an indication that e mail has just arrived, i.e., receiving an "e mail notification" paging message, the paging system may also forward a predetermined system-selected portion, e.g., the "electronic address" origin field or the "subject" field, of the e mail message. The paging device user thereby has a limited basis, i.e., knowledge of source or subject field, for determining whether it is worth the effort to find access to the e mail server and retrieve the entire message. The user must still respond to the notification by accessing the e mail server network, i.e., find an Internet terminal and log onto the Internet, to review the specific content of particular interest of just-received e mail message. Just knowing the "subject" field or the "electronic address" origin field does not always provide sufficient information to make a determination as to the value of or interest for a given e mail item. In many cases, the user only finds interest in an e mail item, e.g., a "pushed" e mail item, when such e mail item contains specific information or may only be interested if a specific portion of the e mail item is relevant. Thus, users need more information than the origin or subject field to make determination as to the worth of a given e mail message.

Some computers have an ability to present text information e.g., ASCII data or data converted to ASCII data, by conversion to audible or voice presentation. Algorithms for reading text and converting text to voice presentation are known and commonly available.

While it would be desirable to send an entire e mail message to a remote wireless device, e.g., a paging device, to avoid need for accessing the e mail server, such arrangement is impractical because paging devices typically cannot store significant amounts of data and often have limited display capabilities. Diverting an entire e mail messages through a paging system broadcast protocol for receipt at remote wireless paging devices taxes not only the ability of the paging devices themselves, but also the bandwidth of the paging system.

Thus, e mail recipients making use of paging devices to receive notification of new e mail messages have been and continue to be burdened by a need to react to e mail notification by finding access to their e mail service provider, i.e., logging onto the Internet and retrieving the e mail message via computer terminal.

#### SUMMARY OF THE INVENTION

The present invention is applicable to a radio signal paging system which includes a number of paging receivers, each receiver being associated with a subscriber. The subscribers also receive electronic mail on a separate computer network. The system provides means for sending paging messages when an electronic mail message is received on the separate system. During a system configuration step, an example electronic mail message is displayed to a subscriber. The subscriber identifies information in said example electronic mail message by use of a pointing device to designate selected portions of the message. Rules are thereby



established which can be applied to subsequent electronic mail messages to extract similar information from subsequent electronic mail messages. Each time an electronic message is received, a paging message is sent to the paging receiver. The paging message includes the information obtained by applying the previously established rules to the subsequent message.

The subject matter of the present invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. However, both the organization and method of operation of the invention, together with further advantages and objects thereof, may best be understood by reference to the following description taken with the accompanying drawings wherein like reference characters refer to like elements.

#### BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings in which:

FIG. 1 illustrates a communication system including e mail delivery to a paging system clearinghouse and text-to-voice retrieval of paging messages by way of conventional touch tone telephone following an "e mail notification" paging message including subscriber-defined message sub-content.

FIG. 2 illustrates a subscriber file maintained by the paging system to associate forwarded e mail with paging device subscribers and maintain subscriber-defined message sub-content rules.

FIG. 3 illustrates an e mail message including a sub-content portion selected by a subscriber based on a position within the e mail message.

FIG. 4 illustrates an e mail message including a sub-content portion established by a subscriber based on a tag identifying string and an associated sub-content string.

FIG. 5 illustrates by flow chart processing conducted by the paging system clearinghouse interacting with a subscriber to establish subscriber-defined sub-content rules for forwarded e mail messages.

FIG. 6 illustrates by flow chart processing conducted by the paging system clearinghouse when receiving forwarded e mail for its paging device subscribers and sending notification messages with paging system subscriber-defined message sub-content.

FIG. 7 illustrates a voice response unit (VRU) menu presented by the paging system and making available text-to-voice access for forwarded e mail messages.

FIG. 8 illustrates a VRU menu allowing a subscriber to review and manage forwarded e mail messages using text-to-voice conversion over a conventional telephone line and by use of a conventional touch tone telephone.

FIG. 9 illustrates by flow chart processing conducted by a VRU of the paging system during subscriber access and audible review of forwarded e mail messages.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates generally a communication system including a computer network 12 and a paging system 14. Computer network 12, as illustrated in this particular embodiment of the present invention, comprises a global communication network 16, i.e., the Internet 16. For the present discussion, Internet 16 will be taken as a collection of network service providers, e.g., S1...Sn, interconnected to establish a global communication system network. Each service provider supports users and, as relevant to the present invention, provides an "Internet address" for its users. Each service provider also operates an e mail server allowing its associated network users to receive and send e mail messages from and throughout Internet 16. Thus, it will be understood that a variety of users interact on Internet 16 and each has an ability to address e mail messages to and receive e mail messages from other users on Internet 16. A data source 18, for example, submits e mail 18 to Internet 16 bearing an Internet electronic addresses and Internet 16 operates to deliver and make available such e mail messages to the appropriate user of Internet 16, i.e., e mail messages collect at the appropriate one of the Internet service providers' mail servers.

Paging system 14 includes a paging system clearinghouse 20 coupled to a public switch telephone network (PSTN) 22 and to a radio signal transmission facility 24. Paging system portion 14 receives information from various sources and provides in radio signal 26 paging messages addressed to subscribers 30 of paging system portion 14, only one such subscriber 30 being illustrated herein. Thus, a paging device 28 carried by a paging system subscriber 30 receives paging messages for display to subscriber 30. Each subscriber 30 operates a conventional telephone 36 and interacts via PSTN 22 with clearinghouse 20 for various subscriber

services, and as relevant to the present invention, to retrieve and review e mail messages forwarded to and stored at clearinghouse 20 and made available to subscriber 30 by virtue of a text-to-voice conversion.

Paging system 14 maintains a subscriber files data base 32. Subscriber files data base 32 allows paging system 14 to maintain information on behalf of its paging system subscribers 30. In addition to conventional information maintained in subscriber files data base 32, e.g., conventional paging messages and voice messages, clearinghouse 20 also maintains for each subscriber 30 a collection of forwarded e mail messages. Subscribers 30 establish a forwarding function relative to their Internet 16 e mail whereby clearinghouse 20 receives forwarded e mail 34 from Internet 16, i.e., receives copies of e mail originally addressed to subscribers 30 of paging system 14. More particularly, subscribers 30 have access to a personal computer terminal 39 coupled to Internet 16. By means of such Internet 16 access, subscribers 30 establish a forwarding feature for their Internet 16 e mail whereby copies of their e mail arrive as forwarded e mail 34 at clearinghouse 20. Forwarded e mail 34 is collected according to its original recipient, i.e., according to each subscriber 30, and stored in an associated subscriber file of data base 32.

Thus, each subscriber 30 has his or her Internet 16 e mail forwarded to paging system 14 as forwarded e mail 34 for storage at clearinghouse 20. Each subscriber 30 accesses his or her Internet 16 e mail in conventional fashion by means of computer terminal 39 and interaction on Internet 16. The present invention provides, however, an alternative mechanism for accessing Internet 16 e mail without requiring subscriber 30 to make use of an Internet 16 computer terminal 39. Because computer terminals are not always available for immediate use,

subscriber 30 may not always be in position to immediately review just-received e mail messages. Under the present invention, a subscriber 30 interacts with clearinghouse 20 via PSTN 22 and a conventional touch-tone telephone 36. Clearinghouse 20 includes a voice response unit (VRU) 38 including a text-to-voice conversion function. When a subscriber 30 accesses clearinghouse 20 in this manner, a variety of information held in subscriber files data base 32 may be obtained. In particular, a subscriber 30 accesses and reviews stored e mail messages as forwarded from Internet 16 and stored in data base 32 via the text-to-voice conversion capability of VRU 38.

Thus, when computer network 12 provides forwarded e mail 34 associated with a particular subscriber 30, clearinghouse 20 issues by way of radio signal 26 an e mail notification paging message 40 displayed on paging device 28. As discussed more fully hereafter, an e mail notification paging message 40 may also include a subscriber-selected sub-portion of or information concerning the associated e mail message. The subscriber 30 receives not only notice that new e mail has arrived, but also receives by display at paging device 28 a subscriber-selected representation of sub-content from the e mail message. Subscriber 30 then better determines whether to access and review the entire e mail message. Because the representation or sub-content as presented on paging device 28 is a subscriber-selected portion of e mail message, the subscriber 30 has ability to control precisely what is displayed on paging device 28 and therefore has a personalized basis for determining whether access to the entire e mail message is necessary, whether such access is by way of voice-to-text presentation via telephone 36 or by way of traditional Internet 16 access using computer terminal 39.

FIG. 2 illustrates the structure of a subscriber file in data base 32 for a particular subscriber 30. For each paging system 14 subscriber 30 a separate file, generally as structured in FIG. 2, provides information concerning that subscriber 30 and stores information to be made available to that subscriber 30, e.g., paging messages, voice messages, and, under the present invention, e mail messages via text-to-voice conversion. In FIG. 2, each subscriber 30 has a unique subscriber ID 32a and a password 32b allowing the subscriber 30 access to messages stored by paging system 14. An e mail address 32c for each paging system subscriber 30 provides a basis for associating each item of forwarded e mail 34 with a particular subscriber 30. Profile 32d holds a variety of information specific to a particular subscriber 30, but not relevant to the present invention. A paging messages section 32e stores a set of most-recent paging messages transmitted to the paging device 28 of this particular subscriber 30. Similarly, voice messages section 32f stores a set of most recent voice messages received for this particular subscriber 30. Subscribers 30 access clearinghouse 20 by way of telephone 36, PSTN 22 and VRU 38 to review the content of paging messages section 32e and voice messages section 32f in conventional fashion.

Under the present invention, a e mail messages section 32g stores a set of most-recent e mail messages, i.e., e mail messages received from Internet 16 as forwarded e mail 34, associated with a particular subscriber 30 by means of e mail address 32c. Subscribers 30 may not wish for all e mail messages to be forwarded to paging system 14. Thus, each subscriber 30 also establishes a filter criteria 32h to be stored in their subscriber file of database 32 and determine whether or not clearinghouse 20 will keep a given e mail item. Each subscriber 30 also establishes one or more content subset rules 32i which identify a subscriber-defined portion of or information concerning e

mail messages to be forwarded to the associated subscriber 30 in conjunction with an e mail notification paging message.

FIGS. 3 and 4 illustrate example e mail messages as originally intended for presentation to a subscriber 30, e.g., a screen image as composed by data source 18. FIGS. 3 and 4 illustrate two suggested methods for identifying by subscriber-definition sub-content within e mail messages whereby a subscriber-defined portion of an e mail message appears on a paging device 28. In FIG. 3, e mail message 50 includes a recipient field 52, a sender field 54, and a subject field 56. Recipient field 52 identifies a subscriber 30, i.e., matches an e mail address 32c in one of the subscriber files in database 32. The sender field 54 identifies the original source of e mail message 50. Subject field 56 identifies in some fashion the nature of e mail message 50, but not necessarily the content thereof. In other words, subject field 56 is a general reference to the content of e mail message 50, but does not necessarily convey to a subscriber 30 sufficient information to determine its value to subscriber 30. Subscriber 30 may receive one such e mail message 50 daily from this particular source on this particular subject, but may not be interested in reviewing the entire content of a given e mail message 50.

In this particular example, e mail message 50 includes a table 58 and within table 58 a particular cell 60 is of particular interest to subscriber 30. Because cell 60 occurs at a fixed location within e mail message 50, cell 60 may be identified by a horizontal locator 62 and a vertical locator 64. Thus, cell 60 represents a fixed location sub-content portion of e mail message 50 which a subscriber 30 finds of particular interest and which may dictate whether or not subscriber 30 has sufficient interest in reviewing the entire content of that e mail message 50.

FIG. 4 illustrates an alternative mechanism identifying sub-content in an e mail message 66. E mail message 66 includes a recipient field 68 identifying one of subscribers 30, a sender field 70 identifying the original source of e mail message 66, and a subject field 72. As with e mail message 50, the recipient field 68 identifies one of subscribers 30 by correlation with the e mail address 32c (FIG. 2) in that subscriber's subscriber file in database 32. Clearinghouse 20 thereby associates a given forwarded e mail message 32, e.g., one of e mail messages 50 or 66, with one of subscribers 30. In this example, subscriber 30 finds interest in the occurrence of a particular character string in e mail message 66 and wishes to receive that character string by paging message, i.e., have that sub-string displayed on that subscriber's paging device 28 in connection with an e mail notification paging message. Subscriber 30 identifies a tag or identifier string 74 and a content string 76. Identifier string 74 is specified by its content, i.e., clearinghouse 20 looks for the occurrence or match with string 74 in a just-received e mail message. Content string 76 is specified by its location relative to identifier string 74. For example, content string 76 may be defined as the next ten characters following identifier string 74. As may be appreciated, however, a variety of relative positioning may be established for content string 76, including concurrence with string 74.

Thus, FIGS. 3 and 4 illustrate subscriber-defined sub-content designations for e mail messages. Whenever an e mail message arrives from a particular source or bearing a particular subject field, then a content subset rule may be invoked to extract from that e mail message a small but particularly meaningful sub-portion for transmission to the subscriber 30 and display on paging device 28.

The present invention proposes that sub-content rules such as illustrated in FIGS. 3 and 4 be established by "screen highlighting" and "point and click" interaction with clearinghouse 20. For example, a subscriber 30 makes use of computer terminal 39 to interact with clearinghouse 20 via



Internet 16. Computer terminal 39 includes a pointing device 51 with buttons 51a-51c.

Pointing device 51 couples to terminal 39 and causes presentation and movement of a pointer 53 on the screen of terminal 39. Subscriber 30 uses pointing device 51 to move pointer 53 about a screen display and, by activation of buttons 51a-51c, highlight portions of the screen display, and thereby highlight portions of e mail messages 50 and 66. Clearinghouse 20 presents an e mail message to a subscriber 30 and subscriber 30 uses screen highlighting and button 51a-51c activation to designate various portions of a given e mail message and establish a content subset rule. It will be understood that e mail messages come in a great variety of standard formats, e.g., ranging from plain ASCII text to HTML to spreadsheet. Under the illustrated embodiment, clearinghouse 20 presents any given e mail message to a subscriber 30 as a screen image and allows subscriber 30 to designate sub-content relative to such screen image. Subscriber 30 thereby deals with the e mail message in the most familiar form, i.e., a screen image, and need not be concerned with the particular underlying message formatting.

FIG. 5 illustrates by flow chart interaction between a subscriber 30 and clearinghouse 20 in establishing content subset rules. Generally, the flow chart in FIG. 5 allows a subscriber 30 to sequentially pass through the e mail messages stored in e mail messages portion 32g for that subscriber 30 and, if desired, designate a content subset rule. Processing begins in block 80 where clearinghouse 20 points to the first e mail message stored for subscriber 30. In block 81, clearinghouse 20 retrieves and displays that particular e mail message on subscriber 30 computer terminal 39. Decision block 82 provides opportunity for subscriber 30 to delete the e mail message. If the subscriber chooses to delete the e mail item, then processing passes through blocks 83 and 84 where clearinghouse 20 deletes the e mail message from that particular subscriber file and points to the next e mail item, respectively. Processing then returns to block 81 where the next e mail message is retrieved and displayed on a subscriber 30 computer terminal 39.

Decision block 85 represents an opportunity for subscriber 30 to establish a content subset rule for the current e mail message, i.e., the message being displayed on terminal 39. If the user declines, then processing passes to block 84. Otherwise, processing advances to block 86 where clearinghouse 20 obtains a source identifier string from the current e mail message, e.g., copies the sender field 54 from the currently displayed e mail message. The subject field 56 may also be used as an identifier, i.e., establish a class or set of e mail messages subject to this content subset rule. Processing then advances to decision block 87 where the user has opportunity to designate this content subset rule as a fixed location content subset. If the subscriber 30 chooses to define the content subset rule as a fixed location rule, then processing passes to block 88 where clearinghouse 20 prompts subscriber 30 to mark by highlighting the particular sub-content of interest. Processing iterates at decision block 89 until subscriber 30 activates a mouse button. In block 90, clearinghouse 20 stores the source identifier string as taken in block 86 in conjunction with the coordinates of the character string highlighted at the time subscriber 30 activated a mouse button. In other words, subscriber 30 highlights a sub-portion of the e mail message displayed and clicks a mouse button whereupon clearinghouse 20 stores the location, e.g., horizontal locator 62 and vertical locator 64, of that highlighted material. This establishes a content subset rule whereby clearinghouse 20, upon receiving an e mail message from that particular source, employs the location information to extract therefrom a character string and deliver that character string to that subscriber 30 paging device 28. Processing then advances from block 90 to block 99 where clearinghouse 20 determines whether additional e mail messages are to be reviewed and offered to subscriber 30 for deletion or marking with a content subset rule.

Returning to decision block 87, if the user declines opportunity to establish a fixed location subset rule, then decision block 91 provides opportunity to establish a relative location content subset rule.

If the user chooses to establish a relative location content subset rule, then processing advances to block 92 where clearinghouse 20 prompts subscriber 30 for a tag mark, i.e., asks that the user highlight an identifier string 74 (FIG. 4). Clearinghouse 20 then iterates at decision block 93 until subscriber 30 activates a mouse button. In block 94, clearinghouse 20 reacts to the mouse button activation by capturing the currently highlighted string as a tag string 74. Processing then advances to block 95 where clearinghouse 20 prompts subscriber 30 for an associated content subset string 76. Processing iterates at decision block 96 until subscriber 30 has activated a mouse button. Advancing to block 97, clearinghouse 20 reacts to the mouse button activation by storing the relative location of the currently highlighted item in relation to the previously marked tag string obtained in block 94. Subscriber 30 thereby establishes a relative location content subset rule including a source identifier string, tag field string, and the location of a sub-content field in relation to the tag field string. When clearinghouse 20 receives an e mail message from that particular source, it searches the e mail message for occurrence of a character string matching the tag field 74 and then extracts from the e mail message a character string in the designated relative location in relation to the tag field 74. In block 98, the relative location content subset rule is stored as a source identifier string, a tag string, and a relative location value. Processing then advances to block 99 where clearinghouse 20 determines whether additional e mail messages are to be reviewed and offered to subscriber 30 for deletion or marking with a content subset rule.

Returning to decision block 91, if the user declines opportunity to establish a fixed location subset rule, then decision block 71 provides opportunity to establish a comparison-based content subset rule, i.e., a content subset rule referencing a comparison between specified content in the e mail message and a subscriber-defined reference value. In block 73, paging system 20 obtains indication of content in the e mail message to be compared. Such content may be indicated by subscriber 30 by a variety of methods, e.g., fixed location or relative

location to a tag value. In any event, subscriber 30 identifies sub-content within the e mail message to be applied under this particular content subset rule. Continuing to block 75, clearinghouse 20 obtains a reference value and a comparison rule from subscriber 30. For example, subscriber 30 provides a threshold or reference value and specifies a comparison function, e.g., equals, greater than, or less than, to establish a comparison function for use under this content subset rule. Processing then advances to block 99 where clearinghouse 20 determines whether additional e mail messages are to be reviewed and offered to subscriber 30 for deletion or marking with a content subset rule.

As may be appreciated, content subset rules may assume a variety of structures, including a mixture of fixed, relative location, and comparison functions. As illustrated herein, three such structures shown include fixed location, relative location, and comparison separately, but such rules may be used in combination or in combination with other similar such rules identifying message sub-content or representation of message content.

FIG. 6 illustrates by flow chart processing conducted by clearinghouse 20 in response to a given forwarded e mail 34 message. In FIG. 6, processing begins in block 100 where clearinghouse 20 analyses the e mail message to identify the original recipient as a subscriber 30. More particularly, the e mail message arrives as a forwarded e mail 34 message addressed to the clearinghouse 20 Internet address, but bears indication of the original recipient. Thus, in block 100 clearinghouse 20 identifies the e mail address in the e mail message indicating the original recipient and attempts to match this original recipient e mail address with one of its paging system subscribers 30. More particularly, clearinghouse 20 analyses the e mail addresses 32c of subscriber files data base 32 to find a match. If a match occurs, then

clearinghouse 20 has received a copy of an e mail message originally directed to one of its paging system subscribers 30.

Continuing to block 102, clearinghouse 20 applies filter criteria 32h to the just-received e mail message. Such filtering may be used to avoid e mail notification paging messages for each and every occurrence of new e mail. Thus, the application of a filter in block 102 represents opportunity to "toss out" certain e mail messages with respect to storage at clearinghouse 20 and thereby avoid annoying the subscriber 30 with an e mail notification paging message in each and every occurrence of a forwarded e mail 34 message to that particular subscriber 30. The just-received e mail message is thereby associated with a paging system subscriber 30 ID, i.e., a field 32c, as taken from a subscriber file of data base 32.

If the just-received e mail message fails to satisfy the filter criteria field 32h for this particular subscriber 30, then the message is not kept and processing branches at decision block 103 and terminates. Otherwise, the message is to be kept, the associated subscriber 30 is to be notified by paging message, and processing advances to decision block 104. In decision block 104, clearinghouse 20 determines whether this particular subscriber 30 has a maximum allowed number of e mail messages presently stored in data base 32. If a maximum number of e mail messages are presently stored, then processing passes through block 106 where clearinghouse 20 deletes the oldest e mail message presently stored in portion 32g for that particular subscriber 30. In block 110, clearinghouse 20 stores the just-received e mail message in association with the particular subscriber's ID, i.e., subscriber ID field 32a, in the e mail messages 32g for that particular subscriber 30. In this manner, a copy of Internet 16 e mail for this particular subscriber 30 is stored in subscriber files data base 32.

Block 112 represents application of a subscriber-defined content subset rule to this particular e mail message and, if applicable, represents capture of the rule outcome, e.g., capture of message sub-content or information concerning the message as designated by that rule. More particularly, each content subset rule for a given subscriber 30 will include a source identifier string, e.g., a copy of the sender field or a copy of the subject field, to identify a class of e mail messages. Once an e mail message is identified as having a content subset rule, a portion of the e mail message is extracted or information concerning the messages is generated. For a fixed location content subset rule, clearinghouse 20 uses the location information to extract a portion, e.g., character string, of the e mail message. For a relative location rule, clearinghouse 20 searches the e mail message for occurrence of a match with the tag field and if such match occurs then clearinghouse 20 extracts a portion of the e mail message found at the location designated relative to the tag field. For comparison functions, clearinghouse 20 generates information concerning the message, e.g., a representation that a certain value has occurred or that a certain value has occurred in a given range or magnitude relative to a reference value.

Content subset rules may vary according to a variety of implementations. For example, a content subset rule may reference a comparison between content within the electronic mail message relative to given reference content defined by the associated paging system subscriber 30. For example, a subscriber 30 may be interested in receiving notification of just-received e mail when a particular stock value exceeds or falls below a subscriber-defined threshold or reference value. As may be appreciated, content subset rules may be based on a variety of subscriber-defined criteria, including selected combinations of location, tag values, relative location, and comparison functions.

Content subset rules may, in addition to selecting sub-content from an e mail message, determine whether or not an e mail notification paging message will or will not be sent to the associated paging system subscriber 30. Decision block 113 represents a case where the content subset rule inhibits transmission of an e mail notification paging message. Thus, if the content subset rule indicates no notification paging messages to be sent, then processing branches at decision block 113 and exits.

Otherwise, information concerning or content taken from the e mail message is to be delivered to the associated subscriber 30 by way of paging message and display on the associated paging device 28. The rule outcome is typically a character string extracted from the e mail message or provided as a representation of the e mail message content, e.g., the result of a comparison function, as established according to the subscriber-defined content subset rule.

Continuing to block 114, clearinghouse 20 issues by way of radio signal 26 an e mail notification paging message 40. Such paging message 40 indicates to that particular subscriber 30 that clearinghouse 20 has just received a forwarded e mail message and stands ready to make such e mail message available for review by way of VRU 38 and its text-to-voice conversion capability. When clearinghouse 20 successfully applies a content subset rule to the associated e mail message, then the e mail notification paging message also includes the subscriber-defined content subset. Subscriber 30 not only has notification of new e mail, but also an indication of the content of that e mail according to that particular user's particular interests in e mail originating from that particular source. The user then has basis for determining whether need exists to then access the full content of that particular e mail message. Subscriber 30 has, under the

present invention, opportunity to review the e mail message by text-to-voice conversion via telephone 36.

Upon receiving e mail notification paging message 40, subscriber 30 uses conventional touch-tone telephone 36 to interact with clearinghouse 20 by way of PSTN 22. Subscriber 30 interacts with VRU 38 to access a subscriber services VRU menu 200 illustrated in FIG. 7. In addition to conventional message access options available under menu 200, e.g., pressing "1" on telephone 36 to review page messages and pressing "2" on telephone 36 to review voice messages, the present invention provides an additional option for subscriber 30 to review e mail messages by pressing "3" on telephone 36. Upon selecting an option to review e mail messages, VRU 38 then presents review e mail messages VRU menu 202 as presented in FIG. 8. VRU menu 202 allows a variety of access and management options relative to stored e mail messages. For example, pressing "1" on telephone 36 repeats e mail message presentation via the text-to-voice capability of VRU 38, pressing a "2" allows the user to skip to a next e mail message presentation, pressing a "8" allows the user to delete from data base 32 an e mail message currently being presented, press a "9" to skip ahead within a given e mail message, and press "0" to exit e mail message presentation.

FIG. 9 illustrates by flow chart operation of VRU 38 in implementation of menu 202. In FIG. 9, it is assumed that the user has previously provided a valid user ID and password, i.e., as found in a subscriber file 32 in fields 32a and 32b respectively.

Processing illustrated in FIG. 9 represents user review and manipulation of e mail messages stored in portion 32g of a particular subscriber's file maintained in subscriber files data base 32 by clearinghouse 20. In FIG. 9, processing begins in block 300 where VRU 38 points to a



first e mail message stored in portion 32f for this particular paging system subscriber 30.

Advancing to block 302, VRU 38 begins play of the current e mail message by means of the text-to-voice capability of VRU 38. As may be appreciated, each e mail message may be composed of a collection of fields, e.g., a sender field, a subject field, a body field, a date field, etc. It will be understood that VRU 38 begins conversion of an e mail message and presentation of the e mail message as voice information to subscriber 30. The voice presentation of the e mail message may be interrupted, however, by user operation of particular keys on telephone 36 as previously described in VRU menu 202, i.e., the user can repeat, skip, delete, and advance through a particular e mail message in addition to exiting the e mail messages review procedure. Thus, during play of a given e mail message, the user may invoke a "delete" function, i.e., press "8" during playback whereupon processing advances to block 304 and VRU 38 deletes the current e mail message. Processing then continues to block 306 where VRU 38 points to a next e mail message for this particular paging system subscriber 30. Processing then advances to decision block 306 where VRU 38 determines whether additional e mail messages are stored for this particular subscriber 30. If not, then processing terminates. If additional e mail messages remain, however, then processing advances to block 308 where VRU 38 points to the next e mail message stored for this particular paging system subscriber 30. Processing then returns from block 308 to block 302 where the next e mail message is presented to the subscriber 30 by means of text-to-voice conversion and presentation via telephone 36.

If, during e mail message presentation in block 302, the user invokes a "skip" function, i.e., presses "2" on telephone 36, then processing branches from block 302 to decision block 306.

If additional e mail messages remain for this particular subscriber 30, then processing advances through block 308 and returns to e mail message presentation in block 302, i.e., the next e

mail message stored for that particular paging system subscriber 30 is presented by means of text-to-voice presentation. If a particular e mail message is completely presented in block 302, then processing branches from block 302 to block 306 where VRU 38 determines whether additional messages are to be presented and if such additional e mail messages are available, processing branches through block 308 and returns to the presentation procedure of block 302. If the subscriber 30 invokes the "exit" feature, i.e., presses a "0" on telephone 36, then processing branches at block 302 and terminates. While not specifically illustrated in FIG. 6, it will be understood that e mail message presentation may be advanced from field to field or by fixed increments, e.g., fast forward, by operation of a "skip-ahead" feature, i.e., pressing "9" on telephone 36.

Thus, subscriber 30 has virtually immediate notification of new e mail messages but need not obtain immediate access to Internet 16 to review the content of such messages. Under the present invention, subscriber 30 simply obtains access to a conventional telephone and interacts with clearinghouse 20 of paging system portion 14 to obtain access to the content of the new e mail message. Subscriber 30 receives in conjunction with the e mail notification paging message 40 an indication of the content of the particular e mail message. More particularly, by virtue of the subscriber-defined content subset rules established by subscriber 30, subscriber 30 receives specific information extracted from the e mail message for display on his or her paging device 28. The subscriber 30 receives more valuable information than just the source of the e mail message, the subscriber 30 receives a specific portion of the e mail message and may be either satisfied with that particular sub-portion without resorting to accessing the entire content of the e mail message, or may wish to access the entire content of the e mail message by voice-to-text conversion or by screen display on computer terminal 39.

The present invention thereby provides opportunity for subscribers 30 to receive "pushed" data, i.e., great volumes of information, by way of e mail and also receive immediate notification of such e mail messages, but not be burdened by need to react to all such e mail notifications by accessing and reviewing entire e mail messages in every case. Subscriber 30 has the advantage of defining content subset rules and the advantage of receiving selected sub-portions of e mail messages to make determination as to whether the e mail message has value and whether the entire e mail message need be reviewed immediately.

It will be appreciated that the present invention is not restricted to the particular embodiment that has been described and illustrated, and that variations may be made therein without departing from the scope of the invention as found in the appended claims and equivalents thereof.

CLAIMS

What is claimed is:

1. A method of delivering information to a paging receiver, said method comprising the steps:

displaying an example electronic mail message to a subscriber associated with said paging receiver;

identifying by the subscriber information in said example electronic mail message, said step of identifying by the subscriber including screen display of said message and use of a pointing device to designate selected portions of the message;

establishing a rule based on said identifying step, said rule being applicable to a subsequent electronic mail message to obtain a rule outcome, said rule outcome including at least one of information selected from and information concerning said subsequent electronic mail message;

receiving said subsequent electronic mail message;

applying said rule to said subsequent electronic mail message to obtain said rule outcome ; and

sending a paging message to said paging receiver, said paging message including said rule outcome as obtained upon application of said rule to said subsequent electronic mail message.

2. A method according to claim 1 wherein said step of receiving said subsequent electronic mail message comprises the step of receiving said subsequent electronic mail message as forwarded from a computer network, said subsequent electronic mail message being originally addressed to said subscriber within said computer network.
3. A method according to claim 1 wherein said rule references a location within said subsequent electronic mail message, said location being defined by said subscriber.
4. A method according to claim 1 wherein said rule identifies presence of given content within said subsequent electronic mail message, said given content being defined by said subscriber..
5. A method according to claim 1 wherein said rule compares content within said subsequent electronic mail message with a given content reference value defined by said subscriber.

6. A communication system comprising:

a plurality of paging devices, each paging device being associated with at least one of a plurality of paging system subscribers; and

a paging system adapted to receive electronic mail messages forwarded from a computer network, each forwarded electronic mail message being associated with at least one of said paging system subscribers, said paging system upon receiving a forwarded electronic mail message providing an electronic mail notification paging message at a paging device associated with said paging system subscriber, said paging system providing access to the content of said electronic mail message by means of text-to-voice presentation, said paging system providing at said paging device a representation of sub-content taken from said electronic mail message, selection of said sub-content being a function of a content subset rule established by said paging system subscriber.

7. A system according to claim 6 wherein said paging system includes a voice response unit with text-to-voice conversion capability whereby said access to the entire content of said electronic mail message is available to said paging system subscriber by conventional telephone and said voice response unit.

8. A system according to claim 6 wherein said content subset rule references a location within said electronic mail message.

9. A system according to claim 6 wherein said content subset rule references presence of given content within said electronic mail message as defined by said paging system subscriber.

10. A system according to claim 6 wherein said content subset rule references a comparison of content within said electronic mail message with a given content reference value defined by said paging system subscriber.
11. A system according to claim 6 wherein said content subset rule is received by said paging system by interaction between said paging system and said paging system subscriber.
12. A system according to claim 6 wherein said communication system includes a computer terminal including a screen and communication linking said paging system and said computer terminal, and said interaction includes presentation of screen information and said paging system subscriber identifying sub-content relative to said screen presentation.

13. A communication system comprising:

a plurality of paging devices, each paging device being associated with at least one of a plurality of paging system subscribers; and

a paging system adapted to receive electronic mail messages forwarded from a computer network, each forwarded electronic mail message being associated with at least one of said paging system subscribers, said paging system upon receiving a forwarded electronic mail message providing an electronic mail notification paging message at a paging device associated with said paging system subscriber, said paging system providing at said paging device a representation of sub-content taken from said electronic mail message, selection of said sub-content being a function of a content subset rule established by said paging system subscriber.

14. A system according to claim 13 wherein said content subset rule references a location within said electronic mail message.

15. A system according to claim 13 wherein said content subset rule references presence of given content within said electronic mail message as defined by said paging system subscriber.

16. A system according to claim 13 wherein said content subset rule references a comparison of content within said electronic mail message with a given content reference value defined by said paging system subscriber.

17. A system according to claim 13 wherein said content subset rule is received by said paging system by interaction between said paging system and said paging system subscriber.



18. A system according to claim 17 wherein said communication system includes a computer terminal including a screen and communication linking said paging system and said computer terminal, wherein said interaction includes screen presentation and said wherein said paging system subscriber identifies sub-content relative to said screen presentation.

19. A system according to claim 13 wherein said subscriber identifies portions of said electronic mail message by screen highlighting said portions as presented on said screen.

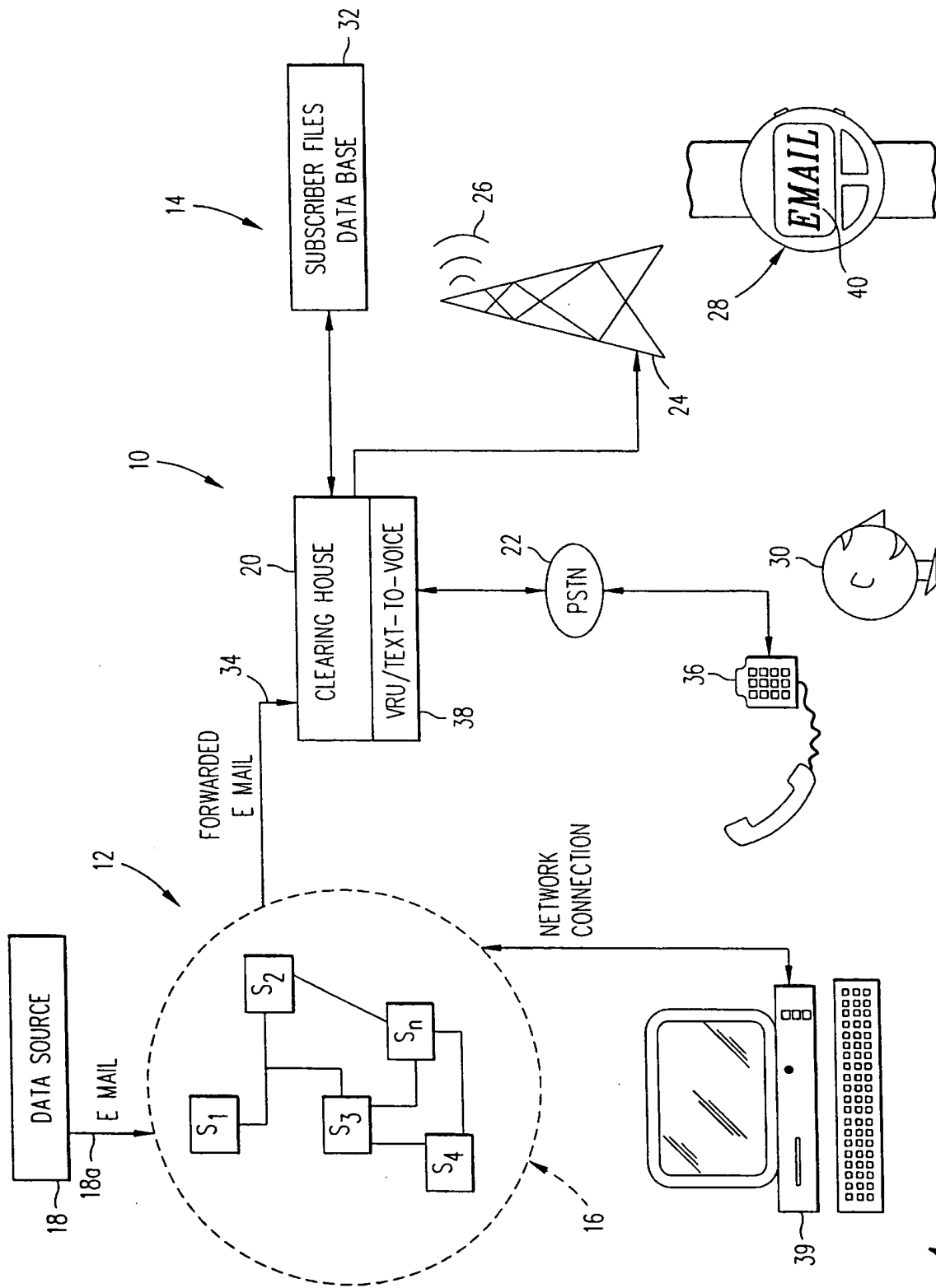
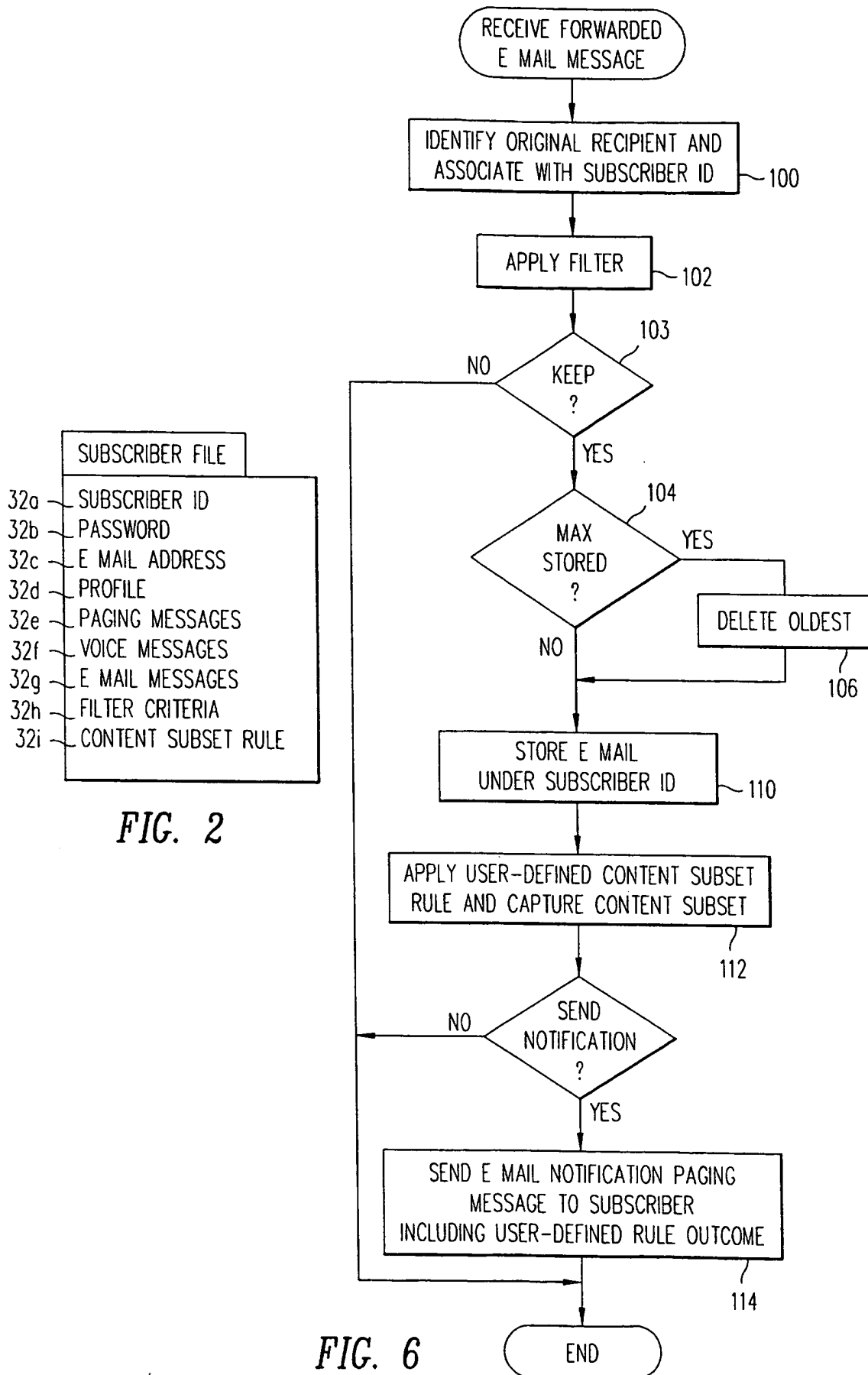


FIG. 1

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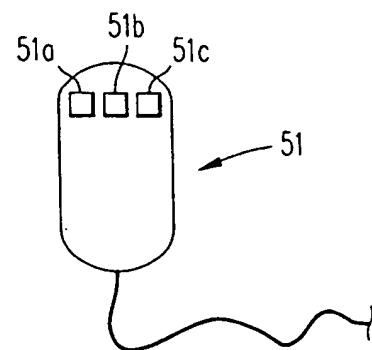
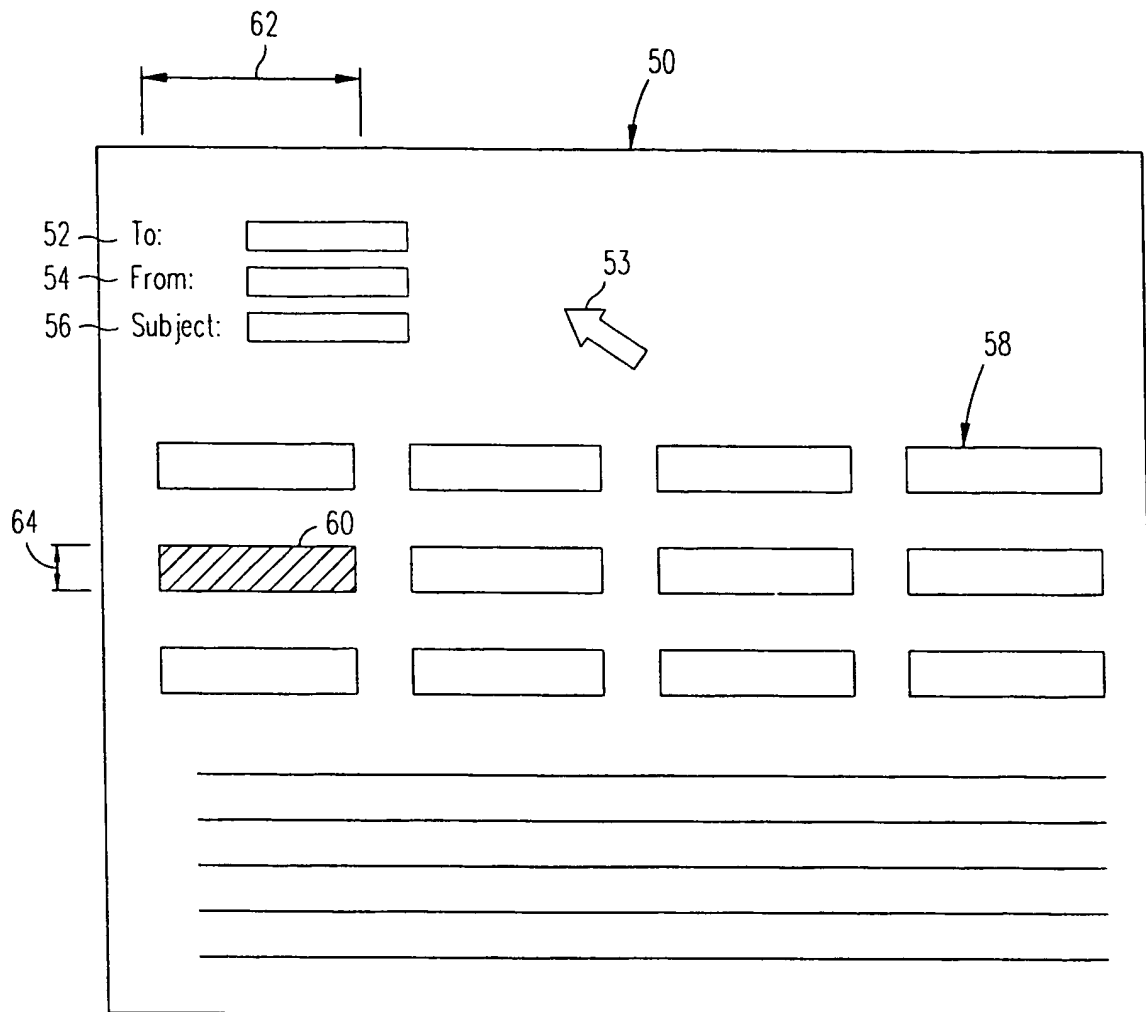


FIG. 3

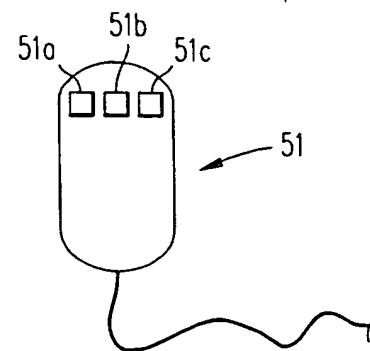
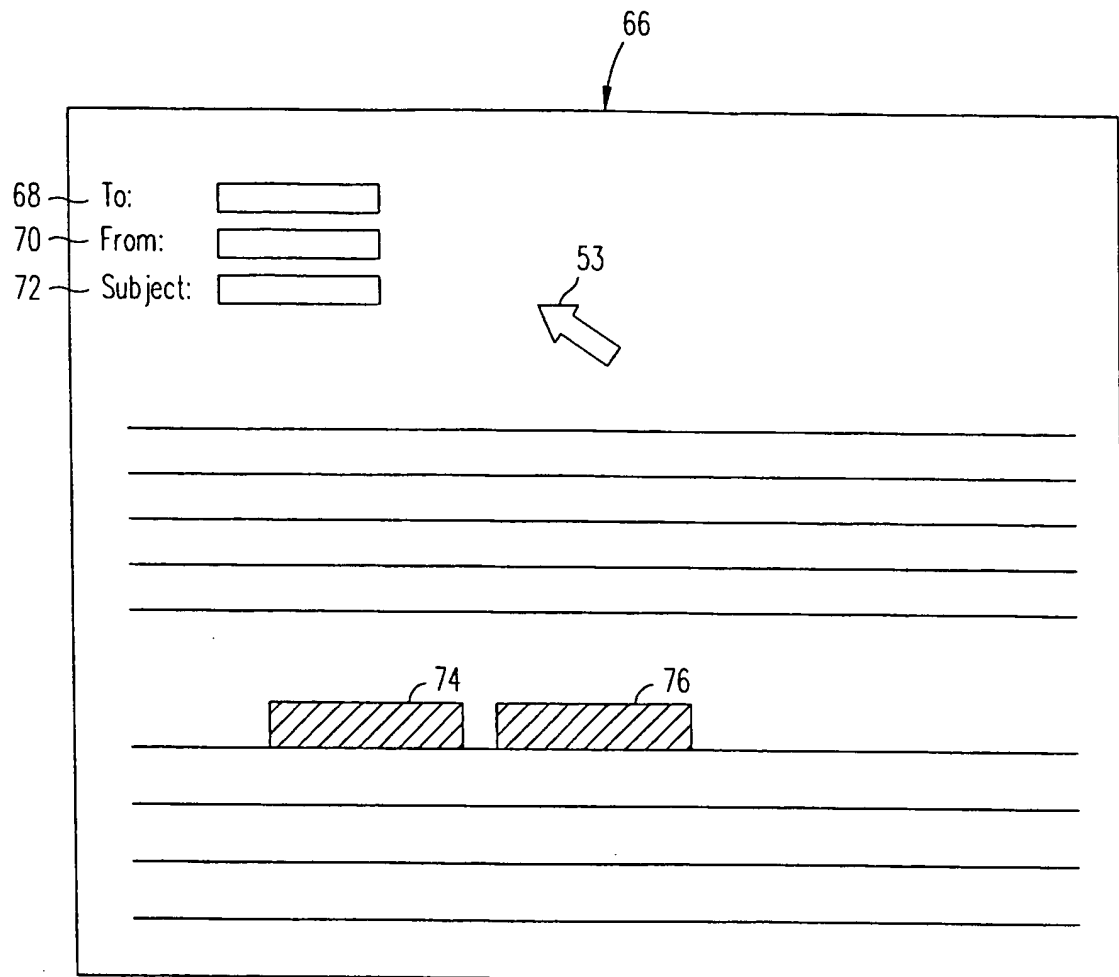


FIG. 4

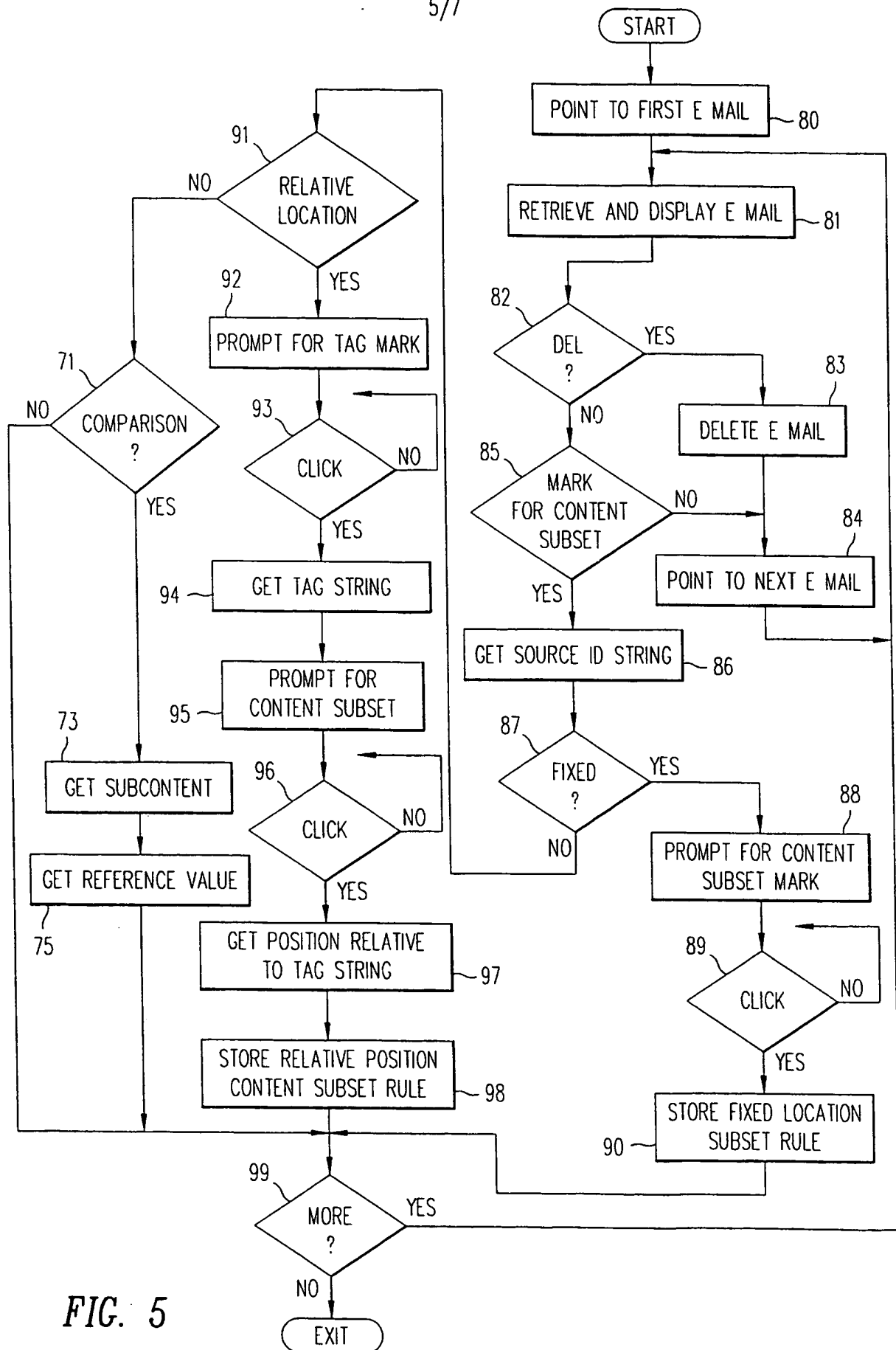
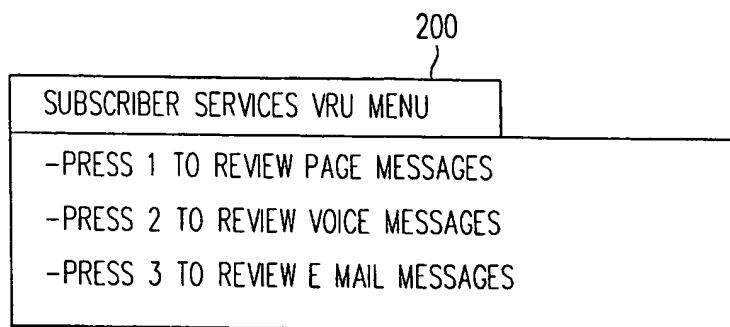
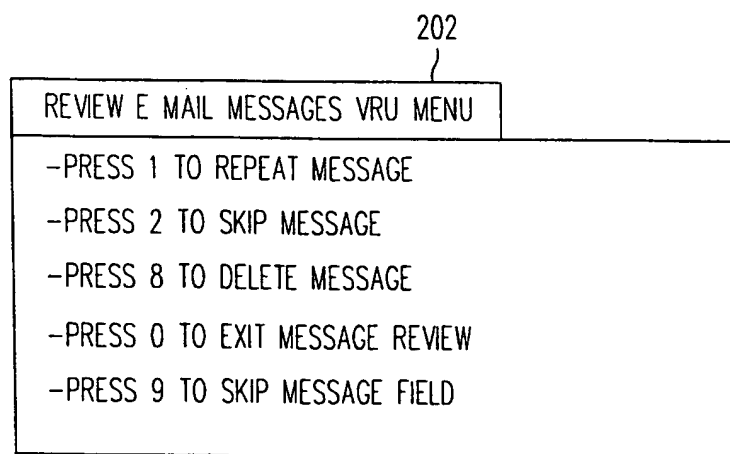


FIG. 5

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*FIG. 7**FIG. 8*

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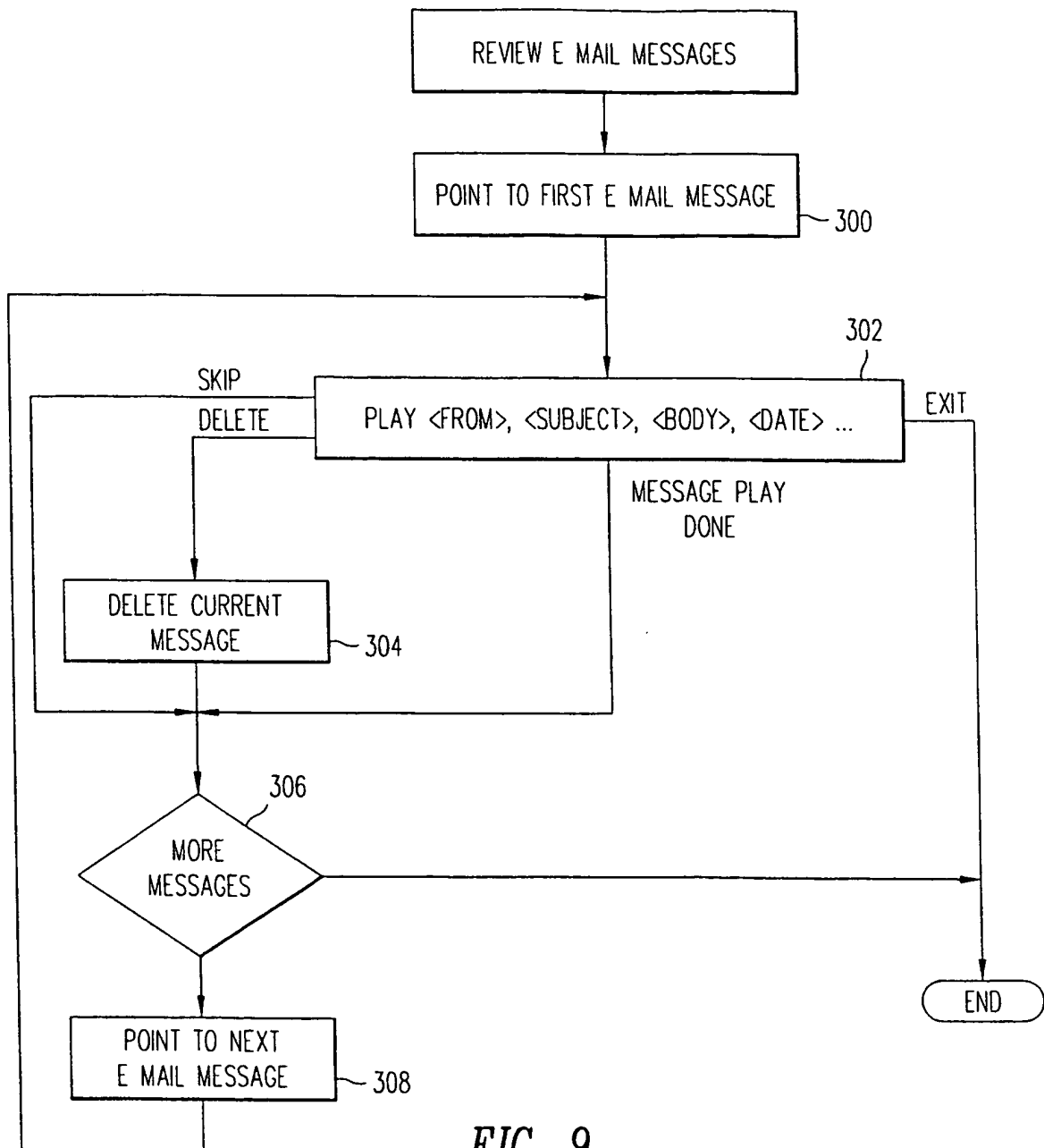


FIG. 9



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/02349

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04Q 7/14

US CL :340/825.44

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 340/825.44, 311.1; 379/67, 93.24; 455/31.2, 31.3, 38.2, 38.4; 706/47; 395/200.36, 200.37; 345/326, 327

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 5,487,100 A (KANE) 23 January 1996, Abstract, col. 1 lines 1-61, col. 3 lines 13-24, col. 5 line 7 - col. 7 line 20 and col. 7 line 63 - col. 8 line 23.	13 _____ 1-12,14-19
Y	US 5,283,856 A (GROSS et al.) 01 February 1994, Abstract, col. 1 line 1 - col. 3 line 16, and col. 4 lines 5-68.	1-5, 8-12, 14-19
Y	US 5,475,738 A (PENZIAS) 12 December 1995, Abstract, col. 1 line 59 - col. 2 line 10, col. 3 line 44 - col. 4 line 67 and col. 8 lines 1-13.	6-12
Y	US 5,600,703 A (DANG et al.) 04 February 1997, Abstract, col. 11 line 65 - col. 12 line 36.	6-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A document defining the general state of the art which is not considered to be of particular relevance	*X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*B earlier document published on or after the international filing date	*Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A document member of the same patent family
*O document referring to an oral disclosure, use, exhibition or other means	
*P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

18 MAY 1998

Date of mailing of the international search report

13 AUG 1998

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/02349

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US 5,691,708 A (BATCHELDER et al.) 25 November 1997, Abstract, col. 3 line 32 - col. 5 line 61.	1-19